Industry Discussion

The Team America Rocketry Challenge: Learning is Not a Spectator Sport

By Bob and Jann Koepke

Model rocketry is absolutely one of the best teaching tools to bring STEM concepts to life. AIAA’s Team America Rocketry Challenge utilizes model rocketry to engage students in a real-life engineering project by challenging them with a specification that they must meet with their own rocket carrying an “astronaut” payload of eggs. They use computer-aided design (CAD) software to work as a team to design and simulate their vehicle, so the performance matches the specification at least on paper. As a team they must agree on not only the design but also components and processes to assure their project will meet the requirements in real-life testing. They launch, gather data, refine and repeat as often as necessary until real life consistently matches the specification as closely as possible. They face constraints of time and budget as well as the limitations built into the specification. The reward for doing this better than other teams is a trip to finals near Washington, D.C. – and possibly to a European air show. And the top 25 teams are invited to go on to the Student Launch project with NASA. This entire experience helps students learn and develop many necessary life skills while still having a lot of fun.

Throughout our country, due to budget limitations schools have been forced to eliminate or scale back many of their hands-on classes. This leaves students in a position where they are more focused on listening than doing. Top students want to be challenged but school projects are often overly simplified. In an article in IEEE Spectrum, an eighth grader explains that she is not excited about STEM because she does not want to build yet another marshmallow-and-straw bridge or tell a toy robot to turn left or right. Yet studies have shown that “Learning is not a spectator sport.” Students need to be actively involved in projects that reinforce the concepts that they are learning. And students learn best when they have an emotional attachment to those concepts. When a Team America Rocketry Challenge group launches the first rocket they designed and built, you can see in the team’s facial expression that emotional attachment.

During our ten years as Team America Rocketry Challenge mentors, we have seen that excitement in STEM ignited in so many students. Or if that love for STEM was already present, the competition helps sustain that love by providing them with a real-life challenge. We see that the rocket challenge builds that ability of students to assess a problem, evaluate ways to resolve it, and then execute and test their solution. In addition to seeing academic subjects such as mathematics and physics in action, they become responsible members of their team as they learn to communicate and work with others towards a common goal. And as they succeed, their confidence in their own abilities grows, which is then reflected in other areas of their life. What does industry need? It needs responsible problem solvers who can work well with others or independently. They need confident, critical thinkers who can manage their time, work effectively and communicate with a variety of others.” These areas are all developed and refined during the Team America Rocketry Challenge.
The rocket challenge also helps students get into their college of choice; we have repeatedly seen this over the years. When students are up against 100,000 other applicants for just a few thousand openings, they need something that will help them stand out from the field – and the rocket competition – and the follow-on Student Launch – help with this. Once in that college, they will draw on the skills they learned and refined during the rocket challenge to help them succeed. Where else can you ignite a student’s love for STEM, develop skills that will help them succeed for the rest of their lives all while having the time of their lives?

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Bob Koeppke is a retired Honeywell Aerospace software
manager, and Jann Koeppke is the STEM K-12 education officer
for the Orange County California Section of the American
Institute of Aeronautics and Astronautics.